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ABSTRACT

This report describes Head Start classroom activity, contains data on the children from a testing program, and includes teacher ratings of pupils on a Classroom Adjustment Checklist. (Individual data is being preserved for follow-up studies.) Classroom observations were made in 13 of 27 Head Start classrooms, while testing activities and teacher ratings of pupil growth went on in all 27. Classroom observations were made on the basis of the Goodman time-sampled observation technique and yielded information on such items as pupil activities, adult activities, use of instructional materials, and pupil-adult ratio. The pupil testing program consisted of the Peabody Language Development Test, the Vocabulary, Sentences, and Geometric Design Subtests of the WPPSI, the Dailey Language Facility Test, and the Test of Basic Information. The Classroom Adjustment Checklist, developed for this report, describes such variables as social interaction, self-control, quality and fluency of speech, independence, and responsibility. [Not available in hard copy due to marginal legibility of original document.] (MH)

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THE ANALYSIS OF DATA GENERATED IN A RESEARCH DESIGNED TO SECURE BASELINE INFORMATION ON A HEAD START PROGRAM

A REPORT TO
THE U.S. OFFICE OF ECONOMIC OPPORTUNITY B89-4263

FROM THE

DEPARTMENT OF RESEARCH
MONTGOMERY COUNTY, MARYLAND, PUBLIC SCHOOLS

November, 1968

PS002038

MONTGOMERY COUNTY PUBLIC SCHOOLS
Homer O. Elseroad, Superintendent

DEPARTMENT OF RESEARCH
Samuel M. Goodman, Director

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APPENDIX A

APPENDIX B

APPENDIX C

In Spring 1968, the Office of Economic Opportunity awarded the Department of Research of the Montgomery County (Maryland) Public Schools the sum of $6,260, under its small-grant application provisions, to facilitate the analysis of data which the department had collected during the school year 1966-67 on the nature and operation of the Head Start Program in the local schools. This report is submitted to the Office of Economic Opportunity in compliance with the contractual provisions of the grant award.

Background of the Data Analysis Activities Supported by the Office of Economic Opportunity Grant

The policy of the educational leadership of the Montgomery County Public Schools is to accompany the development of innovative educational programs with research designed both to secure operational descriptions of new programs and to assess their impact upon pupils.

The Procedure for Describing an Innovative Program like Head Start

The procedure for describing innovative programs in action involves time-sampled observations in which trained observers, using detailed observation schedules, gather for each observation specific data on the organization of the class for instruction, teacher behavior, pupil activities, materials and instructional aids in use, teacher-pupil interaction patterns, subject area(s) involved, variety or sameness in pupil activity, occurrence of small group activity and of individualized instruction, immediate purpose of instruction observed and, in some studies, the nature of verbal interaction in the classroom.

This observational technique, developed by Dr. Samuel M. Goodman, Director of Research of the Montgomery County Public Schools, has been used in many research studies in the Montgomery County Public Schools over the past seven years, to describe the status of curriculum practices in the schools, to assess the impact of specific staff development procedures upon teaching practices, to identify actual differences and similarities in teaching approaches presumed to be different from one another in an area like primary grade reading instruction, and to study the impact of a specific factor like class size upon instructional practice and pupil learnings. Details of the technique are discussed in Appendix A.

The gathering of data on the actual Head Start Program in the Montgomery County Public Schools represented a new application of the Goodman observational technique, this time to a pre-school situation. The purpose of this feature of the here-reported Head Start research was to answer the questions: What, in reality, does a Head Start program in the Montgomery County Public School system look like? What do teachers and aides actually do with and for children? What activities tend to be typical, to occupy the greater portions of time, to be repeated more frequently?

In a very real sense, the answers to these questions provide one level of evaluation of the Head Start Program. The data on such questions reveal whether, for example, in action as well as in avowed intent, Head Start emphasizes the language development of the pupil, his socialization, his acquisition of attitudes toward and understandings of the school environment, and his skills in interacting with adults in school.

The Test Data

The gathering of test data to assess student outcomes has also been a feature of the studies of innovative programs in the Montgomery County Public Schools. In most of the department's studies using the combined gathering of descriptive data and test information, the test battery has been used to ascertain whether there is any significant correlation between demonstrable differences in instructional procedure and differences in impact upon pupils. In the Head Start study, the prime interest in testing was to gather baseline data on a sample of Head Start pupils for use as a point of reference in anticipated follow-up of the pupils as they move through the primary grades. A secondary interest in the Head Start testing was to secure information: (1) on the problems inherent in "mass-testing" very young children and (2) on the feasibility of analyzing test data in terms of differences in approaches to the handling of Head Start pupils from one class to another--if such differences were discovered through the time-sampled observation procedures.

The Data on Teachers' Ratings of the Growth and Personal-Educational Needs of the Head Start Pupils

The avowed purpose of the Head Start program is to stimulate the development of verbal ability, listening skills, ability to play and socialize with peers, acceptable sanitation and food habits, and capability for independent activities in the actual setting.

To secure an estimate of each pupils' growth, the research project officer developed an inventory in which teachers ranked pupils' on 40 specific traits.

The ratings, like the test results, are being preserved in each Head Start pupils' personal file, to be reexamined in follow-up study in the grades.

This report describes the schedule, reviews its development, and reports the results of factor analyses of its items.

The Contribution of the Office of Economic Opportunity Grant to the Head Start Evaluation Project

The survey of classroom practices in Head Start classes had been initiated by the Department of Research of the Montgomery County Public Schools as an "in-house" study, supported in part by funds allocated for evaluation in the original Head Start grant and in part by departmental funds.It had originally been decided to delay any testing activities in Head Start until there was reasonable expectation of the funds needed to employ personnel to administer, score, and process the tests and to secure the electronic data-processing support required. When the additional O.E.O.grant request received favorable initial reaction, the decision was made to add the testing activities described below. The grant from O.E.O. thus enhanced the project not only because it supported the processing of the observational data but also because it made feasible the pilot testing activities here reported.

Chronology of the Project

Preparations for the observational activities began in April 1967, when the director of the Head Start Curriculum, ascertained that funds would be available for supporting a field research team to do the observing. Recruitment of personnel required

approximately a month. The development of the observation schedule, as a modification of observation schedules used in earlier curriculum practices studies by the Department of Research, plus the training of the team of four observers, extended through the first two weeks of May. The time-sampled observations were accomplished between May 15 and June 15, and testing activities occurred between June 26 and July 22.

Scoring of tests and the collation of background information on each examinee, as well as preparation of these data for IBM punch operation was a task that extended over several months thereafter.

The data analysis design called for the writing of data processing programs and for data analysis runs which made demands upon technical manpower and equipment not immediately available. Hence, the request for O.E.O. funds to expedite the data processing was initiated. The grant was received in Spring 1968, and the data analysis here reported was undertaken.

THE PROJECT TEAM

A considerable number of people in the central office of the Montgomery County Public Schools contributed to the development of the instruments used in this project, to the data-gathering activities, and the data analyses, and to the writing of this report, as follows:

Dr. Samuel M. Goodman, Director of Research, Project Coordinator
Dr. Victor E. Small, Supervisor of Research, Project Officer
Mr. Cornell Lewis, Director Head Start Program, Consultant
Mrs. Dorothy Brethouwer, Curriculum Specialist, Head Start Program
Mrs. Ellen Roller, Research Specialist
Mrs. Rose Schwartz, Research Specialist
Mr. Donald Marcotte, Supervisor of Research
Mr. Albert Jenny, 2nd, Research Specialist

The time-sampled observation technique and the design of the observation schedules and data-gathering procedures, developed by Dr. Goodman, were adapted to needs of the Head Start program by Mrs. Roller and Mrs. Schwartz, working with Mr. Lewis, Mrs. Dorothy Brethouwer, and with the four members of the field observation team: Mrs. Warren Shekletski, Mrs. Mary Solliday, Mrs. Ann Williams, and Mrs. Margaret Noyers.

The test battery and the rating scale were developed by Dr. Small, who also supervised the implementation of the data analysis plan.

Participants in the report writing were Dr. Goodman, Dr. Small, Mr. Jenny, and Mr. Marcotte.

The study could not have been undertaken without the cooperation and active participation of all twenty-seven of the Head Start teachers, who contributed ideas incorporated into the observation schedule and into the rating-scale of pupil behavior and development.

These teachers were:

Virginia Boyer	Margaret Haering	Sylvia Press
Miriam Charnow	Madeline Hyatt	Marilyn Rigler
Faith Coddington	Eloise Lawson	Amy Roberts
Mignon Conn	Barbara Martin	Terry Rohr
Elma Erickson	Gertrude Meissner	Bernice Rothberg
Madeline Gary	Peggy Meyn	Kathleen Sweet
Beth Goering	Mary Pahl	Margaret Warfield
Helen Goldberg	Gladys Patlak	Marguerita Will
Vernell Griffin	Beatrice Piearsky	Eleanor Wohlfeld

The Subjects of the Study

The twenty-seven Head Start classes in the Montgomery County Public Schools in 1966-67 provided the subjects for this study.

Observations were conducted in 13 of these classes. The scope of the observation program was limited by funds. Therefore, those classes located in centers most likely to send their "graduates" to schools receiving aid through Title I funds were given priority for the observation program. Then, a matching group of classes in Head Start centers not likely to be sending their pupils to Title I schools was selected, with the plan in mind of following these two groups of pupils through the grades to assess the progress of Head Start graduates and, at the same time, the impact of Title I programs on their development.

For the testing activities and the enterprise in which teachers rated pupil growth, the pupils in all 27 Head Start classes were the subjects.

The twenty-seven Head Start classes were distributed among 22 schools, as indicated below. The eleven schools marked with asterisks were those in which the observation program was conducted. The beginning of the year enrollment figures here given do not, of course, reflect the attendance and drop-out patterns which were necessarily taken into account in securing and using test data for the analyses reported below on the impact of the Head Start program on pupils.

Name of Center	Number of Classes	Number of Children
Bannockburn Elementary	1	17
Burtonsville Elementary	1	13
*Cedar Grove Elementary	2	34
*Clarksburg Elementary	1	19
*Cloverly Elementary	2	37
Colesville Elementary	1	16
Darnestown Elementary	1	15
Forest Grove Elementary	1	16
*Gaithersburg Elementary	1	17
Germantown Elementary	1	16
Laytonsville Elementary	1	15
*Monocacy Elementary	1	15
*New Hampshire Estates Elementary	1	18
*Olney Elementary	1	18
*Park Street Elementary	1	16

Name of Center	Number of Classes	Number of Children
Parkwood Elementary	1	16
*Poolesville Elementary	1	16
Ritchie Park Elementary	3	43
*Rock Terrace	1	12
Rosemary Hills Elementary	1	18
*Travilah Elementary	1	13
Washington Grove Elementary	2	31
TOTAL	27	431

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ANALYSIS OF CLASSROOM OBSERVATIONS

A program for analysis of the Head Start observational data was developed and executed on an IBM 7094 computer at the University of Maryland Computer Science Center.

Three kinds of analyses were attempted. The first involved the simple tabulation of frequencies and percentages of activities, materials used, and group sizes in relation to the several sub-populations involved: children, teachers, aides, and other adults. The second kind of analysis involved "two-way" cross-tabulations of adult categories, group sizes, and activities with pupil group sizes and activities. Finally, an attempt was made to devise "three-way" cross tabulations, (e.g., adult activities against certain adult categories in the presence of other adult categories).

All of these tabulations were made in order to provide a reliable representation of the on-going processes observable in the Head Start Program in relation to the ends of that program. Evidence was sought that would indicate whether attempts were being made to develop verbal ability and working skills, form good sanitation and eating habits, and foster learning to play together and interrelating with adults in a positive manner. The following tabular data will speak to these questions.

Pupil Activities

During 650 observations in classrooms, 1,447 activities involving pupils were found in progress. Observational data on these activities were gathered. The frequency and percentage breakdown of these pupil activities, classified according to the 17 major categories of pupil activities used in the observation schedule are shown in Table 1.

As can be seen from Table 1, if language instruction, discussion, singing-dancing-dramatizing, and reading are considered in the context of developing verbal ability, 19.2% of listed pupil activities were observed to be in this category. Similarly, if manipulating small articles, routines, writing, and helping are viewed as part of the development of working skills, 21.9% of observed activities were so oriented. Learning to play together and to interrelate with adults in a positive manner are functions of motivation and interest which may be related to audio-visual, science experimenting, art, listening and moving, and organized stillness, which together took up 35.7% of the observed activity time. Snack time may have been useful in inculcating good eating habits as well as encouraging social interaction. This occurred 6.6% of the time. The remainder of observed activities were distributed between being inattentive (12.9%), moving to another area (3.4%), and unclassified activities (0.3%).

This would imply that the largest single group of activities was oriented toward interraction with other human beings (both peer-group and adults), the next largest, with developing working skills, and the third largest, with developing verbal ability. These three constituted 83.4% of the observed pupil activities, on the basis of the above interpretation.

TABLE 1

Pupil Activities

Pupil Activities	Frequencies	Percentages	Sub-totalled Percentages
Language Instruction	207	14.3	
Discussion	23	1.6	
Singing, Dancing, Dramatizing	25	1.7	
Reading	23	1.6	
			19.2
Manipulating Small Articles	202	14.0	
Routines	87	6.0	
Writing	2	0.1	
Helping	26	1.8	
			21.9
Audio-Visual	85	5.9	
Science Experimenting	37	2.6	
Art	145	10.0	
Listening and Moving	102	7.0	
Organized Stillness	147	10.2	
			35.7
Snack Time	96	6.6	6.6
Inattentive	187	12.9	12.9
Moving to another Area	49	3.4	3.4
None of the above	4	0.3	0.3
TOTALS	1,447	100.0	100.0

Adult Activities

Adults were divided into five categories: teacher, aide, adult volunteer, student volunteer, and "others." Eight adult activity categories were observed and a cross-tabulation was made of the data for 1,294 such activities, showing frequency of each activity by adult category; percentage observed of each activity, by adult category; and percentage of adults observed in each activity, by adult category. The frequencies and percentages of adult activities are shown in Table 2, while the percentages of adults engaged in each activity, by adult category, are shown in Table 3.

Table 2 shows, as might be anticipated, that the bulk of all adult activities was performed by either teachers or teacher aides, as opposed to volunteers and others. Expectedly, there were some uneven distributions within these two categories for certain activities. For example, 70.2 per cent of adult reading was done by teachers, while only 12.8 per cent of it was done by aides. On the other hand, aides did 66.7 per cent of the writing, while teachers did only 33.3 per cent. Routine activities also fell to aides more than to teachers, but far less markedly: 43.2 per cent of such activities were performed by aides, while 34.8 per cent were performed by teachers. Singing-dancing-dramatizing activities were unique in that aides did not participate, according to the observations. Teachers carried out 62.5 per cent of the latter activities, while adult volunteers were involved to the extent of 18.8 per cent. This was the highest participation of adult volunteers in any activity, although they closely approximated this figure in non-instructional activities (18.4%).

Table 3 shows that the overwhelming majority of adults (88.3%) were active in three of the eight activities listed: talking and listening (34.6%), directed instruction (27.0%), and routine activities (26.7%).

The figures indicate that the techniques used by adults to bring about the pupil activities, presented in Table 1, centered around talking and listening, and directed instruction, and that teachers and teacher aides did most of the work.

Out of all the activities observed, there were 472 instances when two adults were working with the same group of children. There were instances of more than two adults working with the same group of children, reflected in Tables 5 and 6 below, which are not specified in Table 4.

TABLE 2.

ADULT ACTIVITIES, BY ADULT CATEGORY

ADULT ACTIVITIES	TEACHERS		AIDES		ADULT VOLUNTEERS		STUDENT VOLUNTEERS		OTHERS		TOTALS	
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%
NON-INSTRUCTIONAL	12	31.6	13	34.2	7	18.4	2	5.3	4	10.5	38	100.0
READING	33	70.2	6	12.8	5	10.6	0	0.0	3	6.4	47	100.0
WRITING	1	33.3	2	66.7	0	0.0	0	0.0	0	0.0	3	100.0
DIRECTING	40	83.3	7	14.6	0	0.0	0	0.0	1	2.1	48	100.0
SINGING, DANCING, DRAMATIZING	10	62.5	0	0.0	3	18.8	1	6.2	2	12.5	16	100.0
TALKING, LISTENING	248	55.4	104	23.2	53	11.8	4	0.9	39	8.7	448	100.0
ROUTINE	120	34.8	149	43.2	41	11.9	10	2.9	25	7.2	345	100.0
DIRECTED INSTRUCTION	146	41.8	112	32.1	45	12.9	7	2.0	39	11.2	349	100.0
GRAND TOTAL											1,294	100.0

TABLE 3.

ADULT PARTICIPATION IN ACTIVITIES, BY ADULT CATEGORY

ADULT ACTIVITIES	TEACHERS	AIDES	ADULT VOLUNTEERS	STUDENT VOLUNTEERS	OTHERS	TOTALS*
	%	%	%	%	%	%
NON-INSTRUCTIONAL	2.0	3.3	4.5	8.3	3.5	2.9
READING	5.4	1.5	3.3	0.0	2.7	3.6
WRITING	0.2	0.5	0.0	0.0	0.0	0.2
DIRECTING	6.6	1.8	0.0	0.0	0.9	3.7
SINGING, DANCING, DRAMATIZING	1.6	0.0	2.0	4.2	1.8	1.2
TALKING, LISTENING	40.6	26.5	34.4	16.7	34.5	34.6
ROUTINE	19.7	37.9	26.6	41.7	22.1	26.7
DIRECTED INSTRUCTION	23.9	28.5	29.2	29.2	34.5	27.0
PERCENTAGE TOTALS	100.0	100.0	100.0	100.1	100.0	99.9

*TOTAL FREQUENCIES OF TABLE 2 DIVIDED BY GRAND TOTAL OF TABLE 2.

TABLE 4.

Category of Activity of One Other Adult in Relation to Person Acting as Group Leader

Category of Adult Leading Group	Activity of "Other" Adult with Same Group of Children				
	Same %	Different %	Assisting %	Observing %	N_i
Teacher	47.2	19.3	11.6	22.0	301
Adult Aide	66.0	20.0	7.8	6.1	115
Student Aide	50.0	-	50.0	-	2
Adult Volunteer	79.0	10.5	10.5	-	19
Student Volunteer	16.6	33.3	50.0	-	6
Other	41.4	41.4	3.4	13.3	29
TOTAL OCCURENCES					472

TABLE 5.

"Other" Adult Activities

Category of "Other" Person	Activity of "Other" Person	
	Instructional	Routine
Teacher	50.0	50.0
Aide	38.9	61.1
Volunteer	42.7	57.3
Any Pair of Above	56.2	43.8

In order to record variations in the settings within which children were interacting with adults, a "two-way" cross-tabulation was made of the interrelation between the activities of these two adults. Table 4 lists six categories of adults against four types of working interrelationships between them, when working with the same group of children.

Table 4 indicates that when teachers, adult aides, or adult volunteers were the leaders of group activity, the activities of the other adult were in most cases the same as those of the primary person. When student aides were primary, the activities of the other person were evenly divided between "same" and "assisting." With student volunteers, however, most of the activities of the other person were assisting. This might imply that the student volunteers required more help in carrying out their assigned tasks than other categories of persons involved in the project.

When adult activities were broken into two categories, instructional and routine, and the persons viewed as "other" were identified as teacher, aide, volunteer "or any pair of above," 480 instances were recorded which permitted "two-way" cross-tabulation between these adult categories and activities. These data are presented in Table 5.

According to these data, when the "other" adult was a teacher, activities were divided equally between instructional and routine. With aides and volunteers, more routine activities occurred, close to 40% of the time.

A "three-way" cross-tabulation was made, as shown in Table 6, listing five activity categories against categories of primary leaders of groups, as differentiated by categories of "other" adults working with the same group of children.

Table 6 shows that when teachers were the primary group leaders, they were with aides more than with any other adult category, 45.6% of the instances. Of these instances, 24.6% were in routine activities, and 16.8% were in instructional activities. When aides were primary group leaders, they were with voluntters more than with any other kind of adult, 51.8% of the instances. Of these, 35.4% were spent in routine activities, and 13.7% in instructional activities. Volunteers also were with other volunteers in most instances. Of 68.4% of such instances, 36.8% were in routine activities, and 31.6% in instructional activities. However, the total number of instances of volunteers working with volunteers, as reflected by this table was only 19, while there were 309 instances of teachers working with aides, and 110 instances of aides working with volunteers.

An extremely wide variety of intersecting adult and pupil activities was reported. Those combinations occuring in 1.5% or more of the 971 activity-pairings are shown in Table 7. Taken together, they constituted only 18.4% of the 971 observations.

Of these cross-tabulated activities, a little under one quarter appeared to be related to developing verbal ability, over a third, to fostering good eating and sanitation habits as well as social interaction, and more than a third to developing working skills.

TABLE 6.

ACTIVITIES VS. PRIMARY LEADERS OF GROUPS VS. "OTHER" ADULTS

PRIMARY LEADERS = "OTHER" ADULTS =	PERSON OBSERVED																TOTAL
	TEACHERS				AIDES				VOLUNTEERS				OTHER				
	TCHR.	AIDES	VOL.	2 OTH.	TCHR.	AIDES	VOL.	2 OTH.	TCHR.	AIDES	VOL.	2 OTH.	TCHR.	AIDES	VOL.	2 OTH.	
ACTIVITIES																	
NON INSTRUCTIONAL	-	1.3	-	0.6	-	-	2.7	-	-	-	-	5.3	-	-	-	3.4	
READING	-	2.6	0.6	1.9	-	-	-	-	-	-	-	-	3.4	-	-	3.4	
WRITING	-	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
INSTRUCTIONAL	0.6	16.8	13.0	16.5	6.4	5.5	13.7	5.5	5.3	-	31.6	5.3	7.7	3.4	3.4	20.6	
ROUTINES	0.6	24.6	10.0	10.3	9.1	11.7	35.4	10.0	-	5.3	36.8	10.6	14.5	10.6	17.0	13.7	
COLUMN TOTALS	1.3	45.6	23.6	29.3	15.5	17.2	51.8	15.5	5.3	5.3	68.4	21.2	24.2	13.7	20.6	41.3	
NO. OF OCCURRENCES				309				110				19				29	467
PERCENTAGE OF TOTAL N				66.2				23.6				4.1				6.1	100.0

TABLE 7.

Pairings of Adult and Pupil Activities which Accounted for More than 1.5 per cent of 971 Occurrences.

Adult-Pupil Paired Activities	Number of Times	Per Cent
Reading (oral) x listening to story and looking at pictures	21	2.16
Talking and listening x listening or observing and speaking	22	2.27
Teacher directed routine activity x snack or lunch	34	3.50
Child directed routine activity x routine personal care	15	1.54
Child directed routine activity x snack or lunch	15	1.54
Helping pupils x making picture, design, illustration, mural or print	34	3.50
Helping pupils x making model, useful object, structure, puppets, etc.	21	2.16
Helping pupils x manipulating material (puzzle, beads, games, etc).	16	1.65
TOTALS	178	18.42

Analysis of Observation Data on Pupil and Adult Activities, by Individual Class

Table 8 shows, for each school separately, the relative frequency with which pupils were engaged in different types of activities. An activity that was not reportable at least one per cent of the time is not listed.

The table reveals variation among schools, but no patterns emerge that would enable one to categorize classes into variant programs. For this reason, it was not in order to attempt to relate test outcomes, later discussed, to program variation from class to class.

Table 9, which reports the relative frequency with which adults engaged in different activities, reflects more commonality among classes. Listening/observing, direct aid to children, housekeeping routines, direct instruction, and talking and listening were the most frequent adult activities in all classes.

Even so, however, the variation from school to school in adult activities frustrated any effort to categorize classes by pattern of adult activity and, by that token, precluded any analysis of test data in relation to modal adult activities in the classroom.

TABLE 8.

Percentages[a] for Each[b] of the Pupil Subactivities for Each School

Subactivity	Schools											Total
	A	B	C	D	E	F	G	H	I	J	K	
n_i	120	88	126	97	278	136	128	147	163	118	104	1505
Playing with large toys	1.7	3.4	11.9	4.1	7.9	5.9	21.1	6.8	6.7	10.2	16.3	8.7
Manipulating material (clay, etc.)	10.8	1.1	4.8	11.3	11.5	3.7	7.0	8.8	11.0	0.8	5.7	7.6
Snack time (lunch)	6.7	15.9	4.0	8.2	7.9	4.4	3.1	7.5	4.3	5.1	3.8	6.3
Making picture, design, illustration, mural, print	14.2	3.4	7.9	4.1	5.8	8.1	0.8	1.4	3.1	5.1	6.7	5.4
Playing house	3.3	8.0	6.3	6.2	4.0	5.1	8.6	2.7	6.1	5.1	2.9	5.1
Playing (with small toys)	2.5	3.4	7.9	3.1	3.2	5.9	17.2	2.0	2.5	6.8	3.8	5.1
Resting, to story/music	5.8	4.5	4.0	6.2	5.0	2.2	0.8	6.1	9.2	5.9	5.7	5.1
Making model, useful object, etc.	5.8	8.0	3.2	2.1	3.6	0.0	5.5	3.4	1.8	5.9	4.8	3.8
Waiting	3.3	2.3	4.8	2.1	2.5	4.4	0.8	7.5	8.6	0.8	2.9	3.8
Listening or observing and speaking	3.3	4.5	0.8	3.1	2.2	8.1	2.3	1.4	4.3	8.5	4.8	3.7
Watching	0.8	4.5	7.1	4.1	3.6	0.7	5.5	2.7	1.8	2.5	3.8	3.3
Personal care	2.5	1.1	4.8	5.2	1.8	5.9	5.5	2.0	2.5	3.4	0.0	3.1
Moving to another area for instruction or activity	5.0	4.5	2.4	2.1	2.5	2.9	0.8	4.1	3.1	0.8	5.7	3.0
Inactive	4.2	1.1	4.0	1.0	3.2	2.9	1.6	4.8	1.8	1.7	3.8	2.9
Moving around, not participating	5.0	3.4	2.4	1.0	3.2	2.9	1.6	2.0	0.6	4.2	2.9	2.7
Audio-visual materials	6.7	1.1	0.0	4.1	0.4	9.6	3.1	0.0	1.8	0.0	2.9	2.5
To teacher, visiting teacher, another adult	2.5	3.4	1.6	4.1	1.8	2.2	2.3	3.4	1.2	1.7	1.0	2.2
Cleaning up after self	0.0	5.7	0.8	2.1	1.8	2.2	0.0	2.7	3.1	2.5	1.0	1.9
Singing, playing musical instruments, moving to rhythm	1.7	0.0	2.4	3.1	1.4	2.2	0.0	2.0	0.6	2.5	1.9	1.6
Games (without music)	0.8	1.1	1.6	1.0	0.7	0.7	0.0	1.4	3.7	0.8	3.8	1.4
Water play	0.8	0.0	1.6	0.0	3.6	1.5	0.8	2.0	0.0	0.8	0.0	1.3
Looking at books	2.5	0.0	0.8	2.1	1.4	2.9	1.6	1.4	0.6	0.0	0.0	1.3
Dramatizing, pretending	2.5	1.1	1.6	3.1	0.4	1.5	0.8	0.7	0.0	2.5	1.9	1.3
Observing and examining with discussion	1.7	2.3	0.0	1.0	1.1	1.5	0.0	1.4	0.6	2.5	0.0	1.1
Running	0.0	0.0	1.6	0.0	2.2	0.0	0.0	3.4	0.6	0.8	1.0	1.1
Acting up	0.0	0.0	2.4	0.0	2.9	0.0	0.0	2.0	0.0	0.0	1.0	1.0
Other (being in-attentive to organized activity)	1.7	1.1	0.8	2.1	1.1	0.0	0.0	0.7	1.2	0.0	2.9	1.0

[a]Percentages, with the exception of total, are calculated on the basis of the n_is for each school.

[b]Thirty-four subcategories of activity, each accounting for less than one percent of the total number of observations, and combined accounting for the remaining 12.7% of the total number of observations, are not listed.

TABLE 9.

Percentages[a] for Each[b] of the Adult Subactivities for Each School

Subactivity	School											Total
	A	B	C	D	E	F	G	H	I	J	K	
n_i	108	112	108	82	223	84	94	96	150	94	106	1257
Listening to and/or observing	14.8	11.6	16.7	4.9	7.6	7.1	18.1	4.2	6.7	12.8	13.2	10.4
Child-directed (personal aid and assistance)	5.6	10.7	17.6	4.9	9.9	14.3	7.4	14.6	6.7	11.7	9.4	10.1
Room-directed (housekeeping, etc.)	10.2	19.6	12.0	7.3	5.8	7.1	7.4	10.4	8.0	10.6	1.9	8.9
Instruction-directed (helping pupil(s))	13.9	4.5	5.6	3.7	7.2	7.1	17.0	10.4	6.0	18.1	8.5	8.9
Talking and listening (conferring, etc.)	6.5	9.8	0.9	13.4	11.2	13.1	9.6	12.5	8.7	7.4	3.8	8.8
Instruction-directed (distributing and preparing materials)	5.6	5.4	1.9	6.1	2.7	1.2	4.3	8.3	16.0	3.2	10.4	6.0
Teacher-directed (personal care)	9.3	11.6	7.4	4.9	6.7	3.6	2.1	5.2	3.3	2.1	6.6	5.9
Directing (teacher directing music, etc.)	2.8	1.8	0.9	3.7	4.0	3.6	2.1	5.2	9.3	3.2	3.8	3.9
Conferring with other personnel	5.6	4.5	4.6	3.7	4.5	0.0	8.5	1.0	3.3	1.1	3.8	3.8
Talking and observing (moving around room, etc.)	0.0	1.8	7.4	3.7	7.2	2.4	5.3	3.1	4.0	2.1	0.9	3.8
Instruction-directed (routine directions)	0.9	4.5	1.9	2.4	4.9	3.6	1.1	9.4	4.0	2.1	3.8	3.7
Instruction-directed	4.6	1.8	0.0	13.4	2.2	2.4	0.0	1.0	3.3	4.3	2.8	3.0
Instruction-directed (participating with pupils in on-going activities)	1.9	0.9	0.9	6.1	3.6	2.4	1.1	1.0	0.0	5.3	8.5	2.8
Giving directions (instructional)	3.7	0.0	1.9	4.9	1.3	2.4	2.1	5.2	3.3	0.0	3.8	2.5
Correcting student's behavior or reprimanding	0.0	1.8	2.8	1.2	4.9	1.2	2.1	3.1	0.0	1.1	3.8	2.2
Reading (oral)	7.4	0.9	0.0	1.2	0.9	8.3	4.3	0.0	1.3	0.0	0.9	2.1
Instruction-directed (operating audio-visual equipment)	3.7	0.0	1.9	6.1	1.3	2.4	0.0	0.0	0.7	3.2	3.8	1.9
Inactive (doing nothing else)	0.0	0.0	2.8	0.0	3.1	0.0	1.1	0.0	1.3	3.2	6.6	1.8
Talking and illustrating or demonstrating	0.0	2.7	2.8	2.4	3.1	0.0	2.1	0.0	2.7	2.1	0.0	1.8
Administrative (taking attendance, etc.)	1.9	0.9	3.7	0.0	1.8	0.0	1.1	1.0	4.0	1.1	0.9	1.7
Talking	0.0	4.5	0.9	1.2	0.9	0.0	1.1	0.0	2.0	0.0	0.9	1.1
Story telling	0.0	0.0	0.0	0.0	0.9	7.1	1.1	0.0	1.3	0.0	0.9	1.0

[a]Percentages, with the exception of total, are calculated on the basis of the n_is for each school.

[b]Eight subcategories of activity, each accounting for less than one percent of the total number of observations, and combined accounting for the remaining 3.9% of the total number of observations, are not listed.

Instructional Materials Use

There were 1,203 occurrences of the use of a single type of material by pupils. Table 10 lists those materials (and their sub-categories), accounting for more than one per cent of the observed occurrences. Taken together, these amounted to 73.5% of all 1,203 occurrences. The largest single category of materials, comprising about a quarter of those listed in the table, was art supplies. The next largest group, about one-sixth of those listed, was physical education materials. Visual training and health considerations, thus, account for about one-third of the materials listed.

TABLE 10.

Percentage of Each Kind of Instructional Material in Use Accounting for More than One Per Cent of Occurrences

Types of Materials	Sub-Categories	Per Cent	Total Per Cent
Books			
	Variety of titles	1.3	
	One Title	4.6	5.9
Games			
	Matching	1.1	
	Puzzles	2.2	3.3
Science			
	Specimens	1.4	1.4
Art			
	Crayons	3.6	
	Paint	4.5	
	Paper	5.9	
	Clay	2.5	
	Other	1.3	17.8
Physical Education			
	Large wheel toys	4.4	
	Large blocks	5.6	
	Indoor gym	1.8	11.8
Audio-Visual			
	Recordings	5.3	5.3
Variety			
	Sand-box	2.1	
	Doll-house	1.9	
	Lunch trays, snacks	13.7	
	Water and water toys	2.9	
	Beads	1.5	
	Pegboards	2.3	
	Color cubes	1.0	
	Small wheel toys	2.6	28.0
TOTAL			73.5

TABLE 11.

Percentages[a] for Each[b] of the Instructional Materials Subactivities for Each School

Subactivity	Schools											Total
	A	B	C	D	E	F	G	H	I	J	K	
n_i	146	102	121	103	241	119	157	92	161	118	115	1475
Lunch trays, snacks	8.9	29.4	11.6	11.7	12.0	8.4	5.1	16.3	5.0	5.9	10.4	10.7
Paper	13.7	5.9	9.9	12.6	7.5	7.6	1.9	6.5	9.9	4.2	11.3	8.2
Housekeeping (dolls, dishes)	2.1	8.8	6.6	6.8	5.0	6.7	12.1	6.5	5.6	5.1	2.6	6.1
Large blocks	2.1	2.9	5.0	0.0	7.1	5.9	7.0	3.3	4.3	5.1	6.1	4.7
Recordings - tape	5.5	2.9	5.8	3.9	3.7	3.4	0.6	0.0	9.3	6.8	5.2	4.4
Paint	5.5	5.9	3.3	1.9	0.8	5.0	3.8	0.0	3.7	6.8	7.0	3.8
Large wheel toys	0.0	1.0	6.6	2.9	2.9	0.0	10.8	2.2	2.5	6.8	5.2	3.8
Small wheel toys	2.1	4.9	11.6	1.9	1.7	1.7	6.4	3.3	1.2	3.4	6.1	3.8
One title (trade books)	8.2	2.0	0.0	2.9	2.9	12.6	4.5	3.3	3.1	0.8	0.0	3.7
Scissors and paste	6.2	0.0	2.5	8.7	3.3	2.5	0.0	6.5	5.0	0.0	5.2	3.5
Water and water toys	0.7	0.0	5.0	1.0	5.4	4.2	5.1	4.3	1.2	5.9	0.0	3.2
Crayons	5.5	1.0	5.0	1.0	5.0	2.5	0.6	0.0	5.6	1.7	0.9	3.0
Puppets, stage, costumes, props	2.1	2.0	5.8	4.9	2.1	1.7	5.1	3.3	0.0	5.9	1.7	3.0
Other (art materials)	4.8	6.9	0.0	1.0	0.8	2.5	3.2	3.3	1.9	8.5	1.7	2.9
Pegboards (hammer and pegs)	3.4	0.0	4.1	3.9	5.8	0.8	0.0	4.3	1.9	0.0	2.6	2.6
Indoor gym equipment	1.4	1.0	1.7	1.9	4.6	2.5	1.9	5.4	1.9	0.0	5.2	2.6
Clay	0.0	2.9	2.5	1.0	3.3	0.8	4.5	4.3	0.6	0.0	1.7	2.0
Doll house (dolls, family, furniture, farm, village, paper dolls)	4.8	1.0	1.7	1.9	1.2	0.0	3.2	0.0	3.1	0.0	2.6	1.9
Puzzles, parquetry blocks	6.2	0.0	0.8	2.9	0.0	0.0	1.3	7.6	2.5	0.0	0.9	1.8
Other - tinker toys	1.4	1.0	1.7	1.0	2.1	3.4	1.3	2.2	3.1	1.7	0.0	1.8
Sand table or box	0.0	0.0	1.7	0.0	0.0	4.2	8.3	0.0	0.0	4.2	0.0	1.7
Blocks, small	1.4	0.0	0.0	1.0	2.9	0.0	0.0	1.1	2.5	0.8	2.6	1.3
Color cubes	0.0	1.0	0.0	1.9	1.2	1.7	2.5	1.1	3.1	0.0	0.9	1.3
Beads	1.4	1.0	0.0	0.0	4.6	0.8	0.0	3.3	0.0	0.0	0.0	1.2
Specimens (grapefruit, objects)	0.7	0.0	0.0	1.9	0.8	0.8	0.0	2.2	3.7	2.5	0.0	1.2
Variety of titles (trade books)	0.0	2.0	0.8	1.0	0.8	5.0	0.6	1.1	1.2	0.0	0.0	1.1
Balls - bean bags	0.0	0.0	0.0	0.0	0.0	0.8	0.0	1.1	3.1	2.5	5.2	1.1
Outdoor gym equipment	0.0	0.0	2.5	0.0	2.1	0.8	0.0	0.0	0.6	5.1	0.0	1.1
Clean up equipment	0.7	7.8	0.0	1.0	0.0	0.0	0.6	2.2	0.0	1.7	0.9	1.1

[a]Percentages, with the exception of total, are calculated on the basis of the n_is for each school.

[b]Thirty-nine subcategories of activity, each accounting for less than one percent of the total number of observations, and combined accounting for the remaining 11.4% of the total number of observations, are not listed.

Analysis of Data on Use of Instructional Materials, by Individual Class

Table 11 shows for each school the relative frequency of use of different instructional materials.

The lunch tray was a constant, important in the development of food habits and social skills. Paper, housekeeping toys, large blocks, recordings, and paint were in evidence in noticeable degree in most classes.

Table 11 evidences the fact that the great variety of materials available to the Head Start pupils was used, this accounting for the fact that no one type was used with great relative frequency.

Pupil-Adult Ratio in Observed Classes

Pupils present in a single visit ranged from zero to twenty-three, while adults present ranged from zero to nine. Percentages of pupil-adult co-occurrence are given in Table 12.

TABLE 12.

Percentage of Times Various Numbers of Adults were Present with Various Numbers of Pupils

Number of Pupils	Number of Adults 0-1	2-3	4-5	6-9	Row Totals
0-4	-	0.1	-	-	0.1
5-8	1.4	4.9	0.3	-	6.6
9-12	2.8	28.0	10.5	0.4	41.7
13-16	2.9	34.6	7.8	0.3	45.6
17-20	-	2.8	1.7	-	4.5
21+	-	1.1	0.5	-	1.6
Column Totals	7.1	71.5	20.8	0.7	

It can be seen from Table 12 that 62.6% (28.0% + 34.6%) of these occurrences involved a range of 9-16 pupils with 2-3 adults. Recorded data indicate that the adult staffing patterns for this range ratio were: teacher and aid (24.8%); and teacher, aide, and other - which could include volunteers, therapists, and principals - (28.4%).

Relations between Number of Adults and Number of Pupils in Classroom Subgroups

In approximately 650 visits to Head Start classes there were 1,891 separate subgroups observed. Subgroup sizes ranged from a solitary pupil to twenty-three pupils. The percentage distribution of group sizes was as follows: In 17.5% of the observations, a solitary adult was observed. Solitary pupils comprised 21.6%. Groups with a size-range accounting for the largest percentage of all those observed consisted of 2-4 individuals (28.2%). Groups of 5-7 individuals constituted 10.2% of the total, with larger groups accounting for the remainder of the observations.

Co-Occurrence between Adults or Pupils in Leading Categories and Group-Sizes of Pupils

There were 1,555 activities in which adults of categories listed on Table 13 were observed with different sized groups of pupils, or in which a pupil was seen to be maintaining the attention of various group-sizes of other pupils. This is shown in Table 13.

TABLE 13.

Percentage of Events in which Each Category of Adult or Pupil was Observed with Eight Different Group Sizes

Adult or Pupil with Whom the Group was Interacting	Number of Pupils in Group 1	2	3-4	5-7	8-10	11-13	14-16	17+	n_i
Teacher	11.3	6.3	11.1	12.0	15.2	23.7	18.6	1.7	539
Adult Aide	27.3	14.3	22.6	16.9	10.4	3.5	1.1	0.9	232
Student Aide	-	-	-	-	-	-	-	-	7
Adult Volunteer	27.7	17.4	27.7	18.3	4.6	3.8	1.8	-	109
Student Volunteer	-	-	-	-	-	-	-	-	7
Other Adult Category	22.4	17.9	25.4	7.4	6.0	3.0	14.9	3.0	67
Two Adults Present	3.8	5.7	9.3	9.3	16.2	26.0	24.6	8.1	366
Pupil	39.3	23.6	22.2	9.8	3.9	1.2	-	-	594

THE TESTING PROGRAM

Pupils Tested and Tests Administered

Individual test administration was restricted to Head Start children. The non-Head Start children in the classes (foster children and children who did not quite meet eligibility requirements were excluded from this testing).

The following battery of tests was given to assess the status of the Head Start children.

1. The Peabody Language Development Test, FormB (PPVT), which measures receptive vocabulary

2. The Vocabulary Subtest of the Wechsler Pre-Primary Scale of Intelligence (WPPSI), which measures expressive vocabulary

3. The Sentences Subtest of the Wechsler Pre-Primary Scale of Intelligence (WPPSI), which measures verbal span

4. The Dailey Language Facility Test (DLFT), which measures language usage skills

5. The Geometric Design Subtest of the Wechsler Pre-Primary Scale of Intelligence (WPPSI), which measures perceptual-motor development

6. The Test of Basic Information (TOBI)

With the exception of the Test of Basic Information, which was administered to small groups, all tests were given individually.

The Sample:

Tests were administered in July to all pupils in the 27 Head Start classes. At this time, the 1966-67 Head Start Program was in its ninth month. Because of absences, test refusals, and drop-outs, complete batteries could be administered to 176 children who had been in attendance for over 94 days.

The test data secured on each child has been recorded in an individual pupil folder which is being banked for reference in follow-up evaluation activities as the Head Start pupils move through the grades.

However the analyses here reported involve only the data on the 176 complete cases.

Comparisons with Normative Data

Table 14 shows the means and standard deviations for the Montgomery County Head Start children together with reference data from publishers' manuals and from distributors.

Table 14

Means and Standard Deviations both for 176 MCPS Head Start Children and for Normative Data on Six Tests

Test	MCPS Head Start $\bar{X}$	S.D.	Test Norms $\bar{X}$	S.D.
Peabody Picture Vocabulary Test	90.9	16.9	100.0[a]	15.0
WPPSI I Vocabulary	7.4	2.4	10.0[b]	3.0
WPPSI I Sentences	8.9	3.5	10.0[b]	3.0
WPPSI I Geometric Design	8.1	2.6	10.0[b]	3.0
Dailey Language Facility	10.4	3.5	10.5[c]	---
Test of Basic Information	52.3	8.9	50.0[d]	10.0

[a] Based on testing 27, 000 white children in the Nashville, Tennessee area.
[b] Based on a stratified random sample, including both whites and Negroes, of the United States population.
[c] Based on preliminary data provided by the author for Head Start children, ages 4-6.
[d] Based on 1434 Head Start children, including the MCPS Head Start children, Values provided by author.

It can be seen in Table 14 that the Montgomery County children in Head Start classes scored, on the average, lower than national norms on the Peabody Picture Vocabulary Test and the three subtests of the Wechsler Pre-primary Scale of Intelligence. On the Daily Language Facility Test and on the Test of Basic Information, the subjects as a group, achieved at the same levels as the norming population. Thus the Montgomery County Head Start pupils achieved lower than the national norms on tests standardized on a population representing a wide range of socio-economic levels, but achieved at expectancy on tests whose norming populations were Head Start pupils.

Effects of Classification Variables

The pupil outcomes reported in the preceding section did not take account of differential pupil characteristics such as sex, residence, race, or attendance.[1] Therefore, analyses of variance were performed to determine whether or not pupils so classified would obtain similar scores.

It was not possible to provide an analysis of sex, residence, race, and attendance simultaneously because the Negro children were predominantly rural, thereby con-

[1] The distribution of Head Start pupils by the various characteristics is given in Appendix E.

founding race and residence. Analyses were therefore limited first to the effects of sex, race, and attendance and, second, to the effects of sex, residence, and attendance. The results shown in Table 15, taken from the various analyses (Appendix B), indicate that rural children obtained significantly lower scores than suburban children on the Peabody Picture Vocabulary test. (The mean scores for both rural and suburban children were below the national mean score.) Similar results were obtained for the WPPSI Vocabulary test.

In the WPPSI Sentences and Geometric Design subtests and in the Dailey Language Facility test, girls in general obtained higher mean scores than boys. Means for the high attendance groups were significantly higher than for the low attendance groups for the WPPSI Sentences subtest, and for the Dailey Language Facility test.

As with the WPPSI Vocabulary subtest, race effects for the Geometric Design subtest and the Dailey Language Facility test favored white pupils over Negro pupils.

Table 15

Mean Scores for Tests Where Analyses of Variance Indicated Significant Main Effects of Independent Variables upon Test Scores[a]

Tests	Variable	Level	$\bar{X}$
Peabody Picture Vocabulary	Residence	Rural	87.5
		Suburban	95.9
WPPSI Vocabulary	Residence	Rural	7.0
		Suburban	8.0
	Race	White	8.0
		Negro	7.1
WPPSI Sentences	Sex	Male	8.3
		Female	9.4
	Attendance	Low	8.5
		High	9.2
WPPSI Geometric Design	Sex	Male	7.4
		Female	8.7
	Race	White	8.6
		Negro	7.8
Dailey Language Facility	Sex	Male	10.1
		Female	10.8
	Race	White	11.1
		Negro	10.6
	Attendance	Low	10.0
		High	10.9

[a]Probability less than .05.

Special mention must be made regarding the combined effects of age and sex (Appendix C) on scores for the Dailey test (not age-standardized) where girls

in general were significantly higher than boys in general. An analysis of this effect indicated that the overall superiority of girls over boys could be attributed to the mean score for older girls (11.9). Younger girls, younger boys, and older boys obtained similar scores (9.9, 10.1, and 9.9 respectively), so that the analyses more correctly indicate that older girls were significantly higher on the Dailey Language Facility test than older boys, younger boys, and younger girls.

Special mention must also be made of the combined effects of race and attendance on WPPSI vocabulary scores. Here the higher average score of white pupils is attributable to the performance of high attendance white pupils only, and not to low attendance white pupils. Further analysis indicated that mean vocabulary subtest scores for white and Negro low attendance pupils and high attendance Negro pupils were nearly identical (7.2, 7.1, and 7.0 respectively). It was the superior performance of the high attendance white pupils (8.7) which raised the overall average of the white pupils so that it was significantly higher than the overall average of Negro pupils.

The foregoing analyses indicate that caution should be used in interpreting overall mean achievement scores for all pupils in a program. They illustrate how overall group scores can be influenced by the differential composition of the groups.

Test of Basic Information

Gains

Three months prior to the July testing enterprise, a preliminary version of the Test of Basic Information was administered to twenty-nine children in the Montgomery County Head Start program as part of the evaluation effort.[2] In July, the final te t booklets of the twenty-nine children who had taken the preliminary version of the test were re-scored for the twenty-one items which were common to the initial and final tests.

A t-test analysis was performed, and the differences were found to be significant: ($t=3.56$, 27 d.f., p .01).

Reliability

Scorer Reliability

The WPPSI tests and the Dailey test required reference to manuals in order to assign scores. For those tests involving scorer judgment, training of scorers was an important factor. Each scorer was briefed on the procedures and each made detailed records of the scores they had assigned to twenty-five children for each of the subtests. Score profiles were compared and agreement or discrepancies were noted. This initial training was followed by a second trial scoring of additional

[2]Appreciation is expressed to Mrs. Margaret Moss of George Washington University, who developed the Test of Basic Information, for administrative assistance, and for assistance in scoring and tabulating the tests.

tests, to receive inter-rater reliability coefficients.

The average intercorrelation of total scores assigned by different scorers for the WPPSI tests, and the score-rescore reliability for the Dailey Language Facility test are shown in Table 16.

Table 16

Average Intercorrelation between Scorers for Tests Administered to Head Start Children

Test	N Scorers	N Cases	$\bar{r}$
WPPSI Vocabulary	3	24	.99
WPPSI Sentences	4	24	.99
WPPSI Geometric Design	4	24	.99
Dailey Language Facility[a]	1	40	.99

[a]Score-rescore reliability

Test-Retest Reliability

Test score reliability is extremely important if decisions or comparisons are to be made on the basis of scores. The test-retest correlation coefficients for all achievement tests are shown in Table 17.

Table 17

Test-Retest Reliability Coefficients for Raw Scores for Tests Administered to Head Start Children in the Eighth and Ninth Months of the Program

Test	N	r
Peabody Picture Vocabulary	51	.55
WPPSI Vocabulary	59	.49
WPPSI Sentences	61	.55
WPPSI Geometric	58	.56
Dailey Language Facility[a]	51	.60
Test of Basic Information	84	.87

[a]For a test doubled in length. Six pictures were used for a test doubled in length

Intercorrelation Among Test Scores

The intercorrelations between raw scores for the tests which were administered are shown in Table 18. The intercorrelations tend to be relatively low. Low values could indicate that the tests tended to measure different aspects of the behavior of children. It is more probable, however, that the relatively low intercorrelations are in part due to the rather low stability or reliability of the measures.

Table 18

Intercorrelations of Raw Scores for Six Criterion Tests Following Removal of the Effects of Two Levels of Age, Sex, Residence, and Attendance

	PPVT	Voc.	Sent.	GD	DLF	TOBI
PPVT		.49	.39	.17	.25	.45
Voc.			.40	.17	.34	.40
Sent.				.16	.23	.50
GD					.01	.26
DLF						.23
TOBI						

The Classroom Adjustment Checklist

Development

Examination of the available behavior rating scales indicated that there was no instrument expressly designed to describe and differentiate the behaviors of five-year-old children in the classroom setting. The development of such an instrument was undertaken, with the Head Start teachers as active participants in the process.

The classroom teachers in the Montgomery County Head Start program were asked to submit descriptions of behavior in the classroom which tended to interfere with achievement of their goals. Statements were to be framed in positive terms. That is, to describe what children did rather than what they did not do. This was difficult to do, and it was necessary to reword some items which were turned in so that a high rating would be associated with "good" or "non-disruptive" behavior. Four teachers who were acting as classroom observers in Head Start classrooms were asked to add items to the pool on the basis of their observations in many classrooms. In addition, other checklists were examined in order to select items which related to behaviors of young children, but which had not been submitted by the Head Start teachers.

The items were assembled into a checklist with a five-point rating scale for each item. Teachers and aides in each Head Start class were asked to independently rate two children, one who represented something of a problem, and one who did not. In addition, the teachers and aides were asked to indicate the degree of confidence they had in their judgements, and to indicate how well they knew the children they rated.

Examination of the results and discussion of the instrument with the Head Start teachers led to changes in the wording of some items and to an expansion of the rating scale to a seven-point scale. Rating results indicated that there were some substantial discrepancies between aide and teacher ratings. Inasmuch as the frames of reference of teachers were thought to be more similar to each other than those of aides, and that teachers appeared to know the children better, the teachers were asked to perform end-of-year ratings.

As in the case of the standardized tests, the scores of each pupil on the checklist have to be recorded in his individual file, for reference in follow-up evaluations as he goes through the grades.

Data on average ratings of the Head Start enrollees and the factor composition of the checklist follow.

Mean Item Ratings

The means and standard deviations for each item in the checklist are shown in Table 19.

Table 19

Means and Standard Deviations of Teacher Ratings on Each Item of the Classroom Behavior Checklist N=349-356

	Item	$\bar{X}$	S.D.
1.	Speaks with normal voice quality	4.87*	1.57
2.	Speaks fluently	5.25	1.39
3.	Uses conventional speech forms in everyday speech	4.91	1.37
4.	Articulates speech sounds which most children at the same age can articulate	4.87	1.54
5.	Enunciates words clearly	4.51	1.57
6.	Speaks as loudly or as quietly as the situation requires	4.41	1.54
7.	Volunteers answers to questions from adults	4.54	1.64
8.	Replies to direct questions from adults	5.01	1.51
9.	Talks with other children	5.16	1.44
10.	Talks with adults	4.93	1.51
11.	Appears to understand what the teacher or aide is saying when directions, corrections, or instructions are not involved	5.43	1.13
12.	Appears to understand simple directions, corrections, or instructions	5.45	1.13
13.	Follows directions	4.91	1.21
14.	Responds appropriately to correction or help	5.04*	1.21
15.	Participates in large muscle activities for scheduled period	5.65	1.21
16.	Participates in small muscle or manipulative activities for scheduled period	5.33*	1.25
17.	Participates in listening activities for scheduled period	5.17*	1.47
18.	Participates in talking activities for scheduled period	4.74	1.61
19.	Remains quiet during organized quiet periods	4.97*	1.39
20.	Is independent of help from adults	5.02	1.67
21.	Is independent of help from other children	5.47	1.93
22.	Content with moderate adult attention	4.90	1.33
23.	Content with moderate peer attention	5.35	1.17
24.	Allows other children to carry on scheduled activities without interference	5.30*	1.45
25.	Feeds self without requiring excessive help	6.50	0.94
26.	Attends to toilet needs without requiring excessive help	6.63	0.75
27.	Attends to dressing needs without requiring excessive help	6.29	0.99
28.	Controls verbal agressive behavior toward adults	6.05*	1.31
29.	Controls verbal agressive behavior toward other children	7.71*	1.39
30.	Controls physical agressive behavior toward adults	6.31	1.18
31.	Controls physical agressive behavior toward other children	5.57*	1.49
32.	Shares toys or other materials as the situation requires	4.99	1.33
33.	Waits his turn to speak in group activities	4.93*	1.49
34.	Takes reasonable care of toys and other instructional materials	5.39*	1.21
35.	Completes assignments or tasks	4.91*	1.23
36.	Seems interested in the general quality of his performance	5.11	1.30
37.	Has energy and drive	5.33*	1.31
38.	Appears confident that he can do what is expected of him	4.81	1.45
39.	Is genuinely curious	4.91	1.43
40.	Maintains his rights to take his turn in games or to use materials	5.21	1.42

*Scored items.

The higher the score the better were the Head Start children in terms of the teacher ratings. Mean ratings for boys and girls were significantly different (.05 level) for scored items.

The children as a whole were rated most highly for items twenty-five through thirty which related to self-care, inhibition of physical aggression toward adults, and verbal aggression toward adults and children. Lowest ratings were assigned to items five, six, and seven which related to enunciation, voice level control, and volunteering answers to questions from adults.

Analysis of the Classroom Adjustment Checklist

The forty items in the classroom adjustment checklist were subjected to two sets of three factor analyses - one for boys and girls separately, and one for boys and girls combined. The two analysis sets were based on different assumptions regarding the relation of item variance to factors.

The first factor analysis, a principal components solution, indicated the existence of three factors. All forty items were significantly related to the first factor, which accounted for 49 per cent of the variation in item scores. This factor could be seen as representing a teacher's tendency to assign consistently high scores on all items to a child she considered "good," and consistently low scores to a child she considered "bad" -- the well-known "halo effect."

The second factor, accounting for 25 per cent of item variance, contains a set of items which is positively related to the factor, and another set which is negatively related to or "loaded" on this factor. High scores on one set would tend to go with low scores on the other set. The bi-polar nature of this factor would appear to represent an "out-going" versus "submissive" type of behavior. The items related to this factor are shown in Table 20.

Also shown in Table 20 is a third factor, consisting of positive loadings for items two to five (and probably item one). Identified as a "quality of speech" factor, it accounts for an additional six per cent of all item variance. The remaining variance was insufficiently structured for interpretation.

The principal components solution is useful for studying how teachers rated children when using the checklist. Another approach, the "varimax" solution, was employed to attain maximum differentiation among the items.

The effect of the second analytic approach was to break up the "goodness" factor, and to separate the bi-polar factor into two factors. The resulting analysis yielded five factors in which all items could be related to one of the five factors. The structure of the five factors and the specific sets of items related to their structure are shown in Table 21.

Factor I, which accounts for 24 per cent of the item variance, appears to relate to an out-going, socially oriented child. Factor II, which accounts for 32 per cent of the item variance, appears to be related to the child's self-control. Factors I and II combined serve as the main basis for the teachers' differentiation among students, accounting for 56 per cent of the

Table 20

Factor Structure (Principal Components Solution) of the Classroom Adjustment Checklist for Boys and Girls Combined

FACTOR II:	Positive Loadings	
	7.	Volunteers answers to questions from adults
	9.	Talks with other children
	10.	Talks with adults
	17.	Has energy and drive
	20.	Maintains his rights to take his turn in games or to use materials
	Negative Loadings	
	19.	Remains quiet during organized quiet periods
	24.	Allows other children to carry on scheduled activities without interference
	28.	Controls verbal agressive behavior toward adults
	29.	Controls verbal agressive behavior toward other children
	30.	Controls physical agressive behavior toward adults
	31.	Controls physical agressive behavior toward other children
	32.	Shares toys or other materials as the situation requires
	33.	Waits his turn to speak in group activities
FACTOR III:		
	2.	Speaks fluently
	3.	Uses conventional speech forms in everyday speech
	4.	Articulates speech sounds which most children at the same age can articulate
	5.	Enunciates words clearly

observed variance.

Factor III is again the speech factor, and accounts for 13.5 per cent of the variance. Factor IV is related to caring for personal needs and accounted for 8 per cent of the variance. Factor V, the remaining factor, related to performing required activities and represented 11.5 per cent of the variance.

The foregoing statistical analyses indicate that scores on sets of items tend to "go together," thus indicating the presence of common factors rather than ratings on different behaviors for each item. The meaning or name which is applied to a factor is based on opinion as to what the factor represents at the conceptual level. If account is taken of the algebraic sign attached to the factors, the forty items in the classroom behavior checklist might be represented most economically by only five generic items such as:

1. Interacts socially in an adequate manner

2. Lacks adequate self-control or is uncooperative

3. Lacks normal quality and fluency of speech for his age

4. Fails to take care of personal needs without help from others

5. Performs required activities for scheduled periods without help from others.

The "varimax" analysis accounted for a total of 89 per cent of the observed variance with five factors. This suggests that only five basically distinct areas of behavior are rated by the items. To devise an instrument which would rate more than five different kinds of behavior at this age is unlikely because of the tendency of teachers to see what may in fact be different behaviors as similar behaviors. The variance which would be attributable to the twenty-seven different teachers was deliberately allowed to enter into the analysis in order to demonstrate outcomes when different teachers rated different children.

In all analyses using the varimax solution, the same five factors emerged and were related to the same groupings of items so that a reasonably high degree of confidence may be placed in the structure of the factors which have been discussed. There was some difference, however, between males and females in terms of the order in which the factors were identified in the analyses. The order of emergence is thought to be related to the level of scores assigned to the items in a factor in that a factor for which the items tend to be given higher ratings emerges before a similar set of items.

The order of emergence effects were examined further. The scores for each of the items assigned to each of the five factors were calculated so that each pupil was assigned five sub-scores instead of a single total score for the forty items in the checklist. Differences in mean scores for boys and girls for each factor were tested for significance. Girls scored significantly higher than boys in Factors II (self-control) and III (speech).

A second discriminant function analysis was performed to determine which items indicated the greatest differentiation between boys and girls. The greatest

Table 21

Factor Structure of the Classroom [redacted] Combined With [redacted]

FACTOR I:
6. Speaks as loudly or as quietly as the situation requires
7. Volunteers answers or speaks for child
8. Replies to direct questions from adults
9. Talks with other children
10. Talks with adults
18. Participates in talking activities for scheduled period
37. Has energy and drive
38. Appears confident that he can do what is expected of him
39. Is genuinely curious
40. Maintains his rights to take his turn in groups or to use materials

FACTOR II:
13. Follows directions
14. Responds appropriately to correction or help
17. Participates in listening activities for scheduled period
19. Remains quiet during organized quiet periods
22. Content with moderate adult attention
23. Content with moderate peer attention
24. Allows other children to carry on scheduled activities without interference
28. Controls verbal aggressive behavior toward adults
29. Controls verbal aggressive behavior toward other children
30. Controls physical aggressive behavior toward adults
31. Controls physical aggressive behavior toward other children
32. Shares toys or other materials as the situation requires
33. Waits his turn to speak in group activities
34. Takes reasonable care of toys and other instructional materials
35. Completes assignments or tasks

FACTOR III:
1. Speaks with normal voice quality
2. Speaks fluently
3. Uses conventional speech forms in everyday speech
4. Articulates speech sounds which most children at the same age can articulate
5. Enunciates words clearly

FACTOR IV:
25. Feeds self without requiring excessive help
26. Attends to toilet needs without requiring excessive help
27. Attends to dressing needs without requiring excessive help

FACTOR V:
11. Appears to understand what the teacher or aide is saying when directions, corrections or instructions are not involved
12. Appears to understand simple directions, corrections or instructions
15. Participates in large muscle activities for scheduled period
16. Participates in small muscle or manipulative activities for scheduled period
20. Is independent of help from adults
21. Is independent of help from other children
36. Seems interested in the general quality of his performance

differentiations were found for Items 24, 31, and 33 in Table 11; namely,

24. Allows other children to carry on scheduled activities without interference

31. Controls physical aggressive behavior toward other children

33. Waits his turn to speak in group activities

These items pertain to the child who fails to allow others to carry on their activities, to control physical aggression, and to wait his turn to speak. These are indicative of the greatest problem areas from the teacher's standpoint in maintaining an orderly classroom, and are the behaviors which contribute most heavily to the discrimination of girls from boys.

Plans for Follow-up of Head Start Program

Pupil identity numbers and receiving school numbers for the children who participated in the Head Start program were retrieved and included with the evaluation records. Of the pupils for whom complete or nearly complete data were available, 161 pupils were enrolled in 15 Title I schools and 111 in 33 non-Title I schools.

It is planned to follow the progress of those pupils who still remain in the Montgomery County Public Schools in Grade 1, in order to assess the evidences of impacts of the Head Start experience upon them.

APPENDIX A

THE TIME SAMPLED-OBSERVATION TECHNIQUE

The Goodman time-sampled observation technique, used in this project, had two key factors:

1. A team of trained observers, using an observational schedule which particularizes specific operational features of the classroom situation record, in coded entries, on a special report details about teacher-pupil interaction, teacher-teacher interaction, teacher activity at time of the observer's entry, activity of pupils interacting with teacher at time of entry, activity of pupils not interacting with teacher (working independently), materials in use, organization of pupils for learning (whole class, small group, individualized instruction), curriculum areas involved in learning activities on-going at time of entry, immediate purpose of instructional and learning activities (skills development, concept development, etc.), space in use, and other details integral to the specific program being researched. The reporting procedure allows provision for recording whether all pupils are engaged in the same or in a variety of activities and are using the same or different materials of instruction. Where relevant to the research purposes, the nature of the verbal interaction is also reportable.

2. The day of the week and the time of the day for a given observation in a given school and class in that school are randomized, so that the data gathered can be interpreted as an accurate reflection of the overall program being researched.

The format of the basic observation schedule has been developed to describe prevailing curriculum practices in total school settings, by grade and subject area. Specific modifications are made in the observation schedule as needed in a particular research. For an intensive study of practices in the teaching of science, for example, detail on science equipment and on science topics are expanded; and, for detail on language arts instruction, detail on elementary language arts activities, materials, and topics are expanded. The specification of these additional details for specific studies are developed by the research team in consultation with the instructional staff most familiar with the instructional area under study.

Once the details of the observation schedule for a particular study have been set, observers are trained in the use of the schedule. Trial observational runs are conducted, and among-observer reliability worked on until an acceptable level of agreement is attained. On trial runs, several observers visit the same classrooms, make independent reports of observations, and then compare their reports to note agreements and discrepancies.

In the actual observation activity, each observer visits classrooms alone. A given observation may take only a few minutes, since the intent is to record what is occurring at time of entry or, if more than one observation is to be made in a more extended visit, at given points in time during the visit.

Data are recorded for each observation by code number, each code number referring to a general topic, like teachers <u>demonstrating</u>, and by sub-codes for specifying <u>what</u> was being demonstrated.

For this research on the program in Head Start classes, it was made certain, through conferences with the director and the curriculum specialist of Head Start and with the Head Start teachers, that provision was made in the schedule for reporting not only data on the organization for instruction and on teacher and pupil activities and materials in use, but also data on the activities of aides and other helpers and on activities and materials peculiar to Head Start.

The following outline of topics used in the observation schedule for the Head Start research reflects the adjustments made in the basic schedule to meet the needs of describing the Head Start program. The frequency data in the outline indicate the number of times a given entry was made in recording all the Head Start activities observed in this study.

There were four observers on the research team. These observers were assigned randomly to the thirteen subject classes, each observer visiting each of the thirteen classes for one full Head Start "school day."

The schedule of observations for the Head Start project was planned to secure reports on on-going activities at fifty points in time in each of the thirteen classes, with ten of these occasions to be taken on each of the five days of the week. These ten observations for each of the days of the week were spaced approximately twenty minutes apart in the time interval of 10:00 a.m. through 1:00 p.m., which contributed the Head Start "school day."

Thus, there were accumulated in this study, reports of on-going activities in Head Start classes at 650 points in time over a three-week period. For each of these points in time, the observer made a separate report on each activity in which any identifiable group of pupils was involved. Since small group activity was the rule in the Head Start classes, each point in time for reporting yielded data on more than one activity. In point of fact, 1,891 activities were seen and reported. The data from these 1,891 activities constitute the basis for the analysis here reported on the Head Start program in action.

DETAILED LISTING OF COLLECTED OBSERVATION DATA

(Each entry indicates the number of activities, out of the total of 1,891 observed activities, in which named element was a feature.)

ADULT ACTIVITIES

Frequency of Occurrences (N=1891)		Activity/Subactivity
		Non-instructional
23		Inactive (doing nothing else)
5		Waiting
10		Changing Activity
38	Total	
		Reading
26		Reading (oral)
10		Reading and telling
11		Story telling
47	Total	
		Writing
2		Writing (other than routine)
1		Writing and listening and/or talking (recording discussion, experience chart)
3	Total	
48	Total	Directing
		Singing, Dancing, Dramatizing
9		Pretending and/or dramatizing
7		Singing and dancing
16	Total	
		Talking/Listening
133		Listening to and/or observing
49		Conferring with other personnel
48		Talking and observing (moving around room,not helping individual children)
23		Talking and illustrating or demonstrating
114		Talking and listening (conferring, discussing, questioning)
14		Talking
6		Praising
1		Announcing
29		Correcting student's behavior or reprimanding
0		Lecturing (imparting information)
31		Giving directions (instructional)
0		Testing
0		Other
448	Total	

ADULT ACTIVITIES (cont.)

Frequency of Occurrences (N=1891)		Activity/Subactivity
		Routines
21		Administrative (taking attendance, collecting money)
116		Room-directed (housekeeping, arranging flowers, arranging furniture, cleaning up, etc.)
77		Teacher-directed (personal care)
131		Child-directed (personal aide and assistance -- tying shoes, buttoning coats, carrying, cuddling, serving lunch)
345	Total	
41		Instruction-directed
120		Helping pupil(s)
25		Operating audio-visual equipment
76		Distributing and preparing materials
37		Participating with pupils in on-going activities
50		Routine directions
349	Total	

PUPIL ACTIVITIES

		Reading Activities
2		Selecting library books
19		Looking at books
2		Other
23	Total	
2		Writing (copying)
2	Total	
		Audio-Visual
7		Listening to mechanical device -- radio, phonograph, tape recorder
36		Listening to teacher, visiting teacher, another adult
0		Listening to public address system, messenger
37		Audio-visual materials (including story with picture)
5		Teacher demonstration, illustration
85	Total	

PUPIL ACTIVITIES (cont.)

Frequency of Occurrences (N=1891)	Activity/Subactivity
	Language Instruction
9	Pupils answering and/or questioning
0	Dictating (experience chart)
13	Reporting ("show & tell," explaining, demonstrating, illustrating, describing)
	Word analysis
0	Rhyming
3	Initial consonant matching
0	Plurals
0	Tense
5	Verbal games
	Dramatization
20	Dramatizing, pretending
79	Playing house
7	Playing with puppets
	Recitation
4	Reciting
9	Finger play
1	Drilling
0	Choral speaking
57	Listening or observing and speaking (talking)
207	Total
	Discussion
17	Discussing
0	Planning (with teacher's help)
0	Making up original stories, situations, poems, lyrics
1	Suggesting (child proposing)
5	Questioning (with free-flow answering)
0	Reviewing (recalling)
23	Total
	Science Experimenting
16	Observing and examining with discussion
1	Observing and examining without discussion
20	Water play
37	Total

PUPIL ACTIVITIES (cont.)

Frequency of Occurrences (N=1891)		Activity/Subactivity
		Listening and Moving
13		Games (without music)
21		Calisthenics or gymnastics
10		Playing with large toys (example: large blocks)
35		Running
16		Skipping
0		Jumping
0		Calesthenics to rhythm
3		Musical games
4		Rhythmical movement
0		Creative art - music
0		
102	Total	
		Art
87		Making picture, design, illustration, mural, print
57		Making model, useful object, structure, puppets, etc.
1		Organizing, arranging a display
0		Garden, aquarium, terrarium
145	Total	
		Manipulating Small Articles
3		Manipulating material (example: clay, sand, puzzles, games, beads, color cones, cubes)
117		Playing (with small toys)
82		
202	Total	
		Singing, Dancing, Dramatizing
25		(including pupils participating actively while others listen, or listening followed by active participation)
25	Total	
		In-Attentive
1		Acting up
16		Annoying others
2		Crying
14		Fighting (physical combat)
4		Arguing
4		Moving around, not participating
42		Hiding
9		Watching
50		In-active
40		Other
5		
187	Total	

PUPIL ACTIVITIES (cont.)

Frequency of Occurrences (N=1891)		Activity/Subactivity
		Organized Stillness With
78		Resting, to story/music
61		Waiting
8		Being disciplined
147	Total	
		Helping
14		Helping teacher
12		Helping other pupils(s)
26	Total	
1		Routines
5		Caring for personal belongings
47		Personal care
32		Cleaning up after self
2		Cleaning up after others
87	Total	
49	Total	Moving to Another Area
96	Total	Snack Time
4	Total	None of the Above

INSTRUCTIONAL MATERIALS IN USE

		Books
5		Trade books
15		Variety of titles
56		One title
8		Reference books
0		Other adult references
9		Magazines
0		Children's magazines
0		Variety
93	Total	
1		Charts
3		Hand-made (large size, displayed on blackboard or chart paper -- on wall, rack, or bulletin board)
0		Group experience chart
0		Individual experience chart
0		Variety of charts
3		Commercial (Pictures)
7	Total	

INSTRUCTIONAL MATERIALS IN USE (cont.)

Frequency of Occurrences (N=1891)		Activity/Subactivity
		Worksheets
0		Teacher-made
0		One kind
0		Variety
2		Commercially-made
0		One kind
0		Variety
2	Total	
		Tests
2		Teacher-made
2		Commercially-made
4	Total	
		Pupil's Own Work
2		Model, diagram, etc. (by pupils)
2		Picture (by pupils)
3		Booklet (made by pupils)
7	Total	
		Skill Development
4		Flash cards
3		Arithmetic
2		Other
1		Variety
10	Total	
		Games, Etc. (box, etc.)
13		Matching games
26		Puzzles, parquetry blocks
0		Variety
0		Alphabet
39	Total	
0	Total	Map
0	Total	Globe
		Mathematic Devices
0		Quantity measure
0		Clock faces
0		Variety
0		Calendar
0	Total	

INSTRUCTIONAL MATERIALS IN USE (cont.)

Frequency of Occurrences (N=1891)		Activity/Subactivity
		Science
0		Thermometer
0		Scale-Weights
0		Microscope
0		Weather instruments
17		Specimens (Examples: grapefruit, objects)
1		Variety (magnifying glass, prisms, etc.)
7		Animals
6		Plants
31	Total	
		Art Materials
43		Crayons
54		Paint
69		Paper
9		Scissors and paste
2		Chalk
30		Clay
10		Tools
0		Variety
1		Pencils
0		Finger paint
0		Collage tray
15		Other
233	Total	
3		Physical Education Equipment
15		Balls - bean bags
3		Jump rope
0		Rings
53		Large wheel toys
67		Large blocks
2		Balance beam
6		Hobby horse
22		Indoor gym equipment (Example: stationary car)
12		Outdoor gym equipment
182	Total	
11		Music
11	Total	

INSTRUCTIONAL MATERIALS IN USE (cont.)

Frequency of Occurrences (N=1891)		Activity/Subactivity
		Audio-Visual Equipment
3		Recordings - tape
64		Radio
0		Pictures - commercial - filmstrips
11		Variety - TV
0		
78	Total	
		Other (manipulative materials)
1		Chalkboard
0		Flannel board
17		Blocks, small
79		Housekeeping (dolls, dishes)
18		Other - tinker toys
3		Variety (combination of 1700)
23		Puppets, stage, costumes, props
141	Total	
		Variety of Materials in Use (other than paper and pencil)
2		Mirror
25		Sand table or box
23		Doll house (dolls, family, furniture, farm, village, paper dolls)
15		Clean up equipment
165		Lunch trays, snacks
35		Water and water toys
2		Template (Example: cookie cutter, tracing equipment)
18		Beads
28		Pegboards (hammer and pegs)
12		Color cubes
3		Cones
31		Small wheel toys
359	Total	

APPENDIX B

INFORMATION RELATED TO AND INCLUDING ANALYSES OF VARIANCE OF ACHIEVEMENT TEST DATA

Analyses of Variance of Effects on Sex, Race, and Attendance On Standardized Test Scores

		PPVT			VOC			SENT			GEOM			Sum V-S-G			TOBI		
Source of Variance	df	MS	F	p	MS	F	p	MS	F	p	MS	F	p	MS	F	p	MS	F	p
Sex	1	28.06	0.1	.754	10.37	1.9	.175	55.04	4.6	.034*	70.33	10.8	.001*	370.67	9.8	.002*	201.21	2.5	.114
Race	1	1,037.76	3.6	.058	30.94	5.5	.020*	0.79	—	.798	25.11	3.8	.052*	96.93	2.6	.111	97.46	1.2	.271
Attendance	1	459.70	1.6	.206	9.38	1.7	.197	23.43	1.9	.165	2.02	0.3	.579	82.86	2.2	.140	95.18	1.2	.277
SR	1	155.46	0.5	.462	6.11	1.1	.298	6.24	0.5	.473	7.69	1.2	.280	7.02	0.2	.667	0.43	—	.942
SA	1	56.59	0.2	.657	3.26	0.6	.446	1.83	0.2	.698	1.56	0.2	.626	17.60	0.5	.495	3.20	—	.842
RA	1	916.02	3.2	.075	23.65	4.2	.041*	2.85	0.2	.628	10.91	1.7	.198	11.53	0.3	.581	17.22	0.2	.643
SRA	1	5.14	—	.893	7.44	1.3	.251	0.37	—	.861	0.34	—	.821	2.85	—	.784	5.76	—	.789

* p less than .05

APPENDIX C

COMBINED EFFECTS OF AGE AND SEX ON SCORES FOR THE DAILEY LANGUAGE FACILITY TEST

Analysis of Variance of Effects of Sex, Age, Residence and Attendance on Raw Scores for the Dailey Language Facility Test

Source of Variance		df	MS	F	p
S	Sex	1	21.7	1.8	0.182
A	Age	1	38.6	3.2	0.075
R	Residence	1	0.0	0.0	0.957
D	Attendance	1	99.0	8.2	0.005*
SA		1	78.2	6.5	0.012*
SR		1	0.2	0.0	0.906
SD		1	0.0	0.0	0.999
AR		1	8.4	0.7	0.405
AD		1	0.0	0.0	0.990
RD		1	13.5	1.1	0.291
SAR		1	4.1	0.3	0.559
SAD		1	1.0	0.1	0.773
SRD		1	0.0	0.0	0.965
ARD		1	1.9	0.2	0.695
SARD		1	30.9	2.6	0.111
Error		159			

*p less than .05